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Supraventricular tachycardia presenting in labour: A case report achieving vaginal birth and review of the literature

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Abstract

Arrhythmias are one of the most common forms of cardiac disease presenting in pregnancy. Women with underlying arrhythmias may only present to health care professionals when they are pregnant. The most common type of sustained arrhythmia presenting in pregnancy is a supraventricular tachycardia (SVT). This can be difficult to diagnose, as symptoms such as palpitations, dizziness and shortness of breath are also common symptoms of pregnancy. We present the management of a woman who developed intrapartum SVT. Her case highlights the importance of considering the diagnosis in the antenatal period, the use of antiarrhythmic drugs, as well as the fact that achieving vaginal delivery is possible in correctly selected cases while the mother and baby remain stable.

Keywords

Cardiac, high-risk pregnancy, maternal-fetal medicine, complications, drugs (medication)

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Introduction

Improvements in medical care mean obstetricians are often presented with medical conditions they do not regularly treat. Recognising these conditions and having an overview of the impact the condition and the treatments can have on a pregnant woman as well as the unborn fetus are important. Supraventricular tachycardia (SVT) is the most common sustained arrhythmia presenting in pregnancy, so knowledge of its management is vital.

We present the history and management of a patient who developed SVT in labour at term. She required medical cardioversion, and proceeded to have a vaginal delivery with good outcomes for mother and baby. Obstetricians often feel a Caesarean section is the safest mode of delivery for women in SVT, but increasing Caesarean rates have impacts on individuals and services. This case shows that with appropriate selection and management, vaginal delivery can be safe in women with SVT.

Case report

A 33-year-old Caucasian woman in her first pregnancy had an uncomplicated antenatal period until she was seen in antenatal clinic complaining of palpitations at 37 weeks gestation. Her pulse was measured at 225 beats per minute (bpm) electronically, but settled to 88 bpm spontaneously. She had no past medical history of tachycardia or heart disease. Thyroid function tests were performed which were normal.

At term plus 8 days she presented in labour at 22:00 hours, 2 cm dilated. Her pulse was again measured at 225 bpm. A cardiotogograph (CTG) was commenced, which also recorded maternal pulse. Fetal heart rate was normal, and maternal pulse settled to around 105 bpm. She was asymptomatic, with no chest pain, palpitations or shortness of breath. Thyroid function tests were again normal. She progressed normally in labour, but intermittently her pulse went above 200 bpm. At 07:00 she was 6 cm dilated, and the maternal pulse went above 200 bpm and failed to settle. Twelve lead electrocardiography (ECG) showed a supraventricular tachycardia (SVT), with a narrow complex tachycardia, and cardiologists and the anaesthetist were asked to review. Fetal heartbeat was normal. Conservative measures in the form of carotid massage and valsalva manoeuvre failed to correct the pulse. The patient remained asymptomatic with a normal blood pressure (BP).

The anaesthetist considered epidural anaesthesia to reduce pain, in the hope this would help control the pulse. However, due to the significant tachycardia not settling, the decision to transfer the patient to theatre was made, where she was medically cardioverted with 12 mg of adenosine intravenously. She reverted to normal sinus rhythm, with a rate of 100 bpm. However, maternal pulse quickly reverted to SVT, so she was given 5 mg of metoprolol intravenously on two occasions 15 min apart. This failed to control the heart rate for any significant time, so 5 mg verapamil was given intravenously, and her pulse settled to normal sinus rhythm. The patient remained clinically stable throughout, awake and talking with no symptoms, and with a normal blood pressure of between 90 to 120 mmHg systolic and 50 to 80 mmHg diastolic. The fetal heart rate was monitored throughout and remained normal.

During this time the patient had progressed to fully dilated. At 10:00 a ventouse delivery was performed. The baby was born in good condition with normal cord pHs. Postnatally the woman was transferred to the cardiac ward for observation, and remained stable. Oral metoprolol, 25 mg three times a day was commenced. Maternal pulse remained around 100 bpm postnatally. A cardiac echo was performed and was normal. She was discharged home on metoprolol and followed up with the cardiologists.

Discussion

Arrhythmias are one of the most common forms of heart disease presenting in pregnancy, occurring in 0.1–2% of pregnant women.[1,2] Women with underlying arrhythmias may only present to health care professionals when they are pregnant. This can be because they are asymptomatic and therefore have never needed to access health care before, or it may be because the arrhythmia only becomes apparent when the body is put under the physiological strain of pregnancy. The most common type of sustained arrhythmia presenting in pregnancy is a SVT.[2,3]

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SVT can also be difficult to diagnose in pregnancy. Symptoms such as palpitations, dizziness and shortness of breath are common symptoms of pregnancy. It is important women presenting with these symptoms are not dismissed, and are investigated properly. As arrhythmias may be intermittent a 12 lead ECG does not rule them out, and a 24-hour ambulatory ECG monitor should be considered. This is especially true if women feel unwell with these symptoms, or symptoms fail to settle.[1,2,4] Other ambulatory techniques for detecting intermittent arrhythmias include continuous loop event recorders and for severe arrhythmias, implantable loop recorders. A 12 lead ECG during the arrhythmia may be required to distinguish between similar appearing tachycardias, such as broad complex SVT and ventricular tachycardia. New and simple smart phone applications can also be used where available.[5] Ultimately, electrophysiological studies may be required to elucidate the exact nature of an arrhythmia and hence the most appropriate management. In our case, accurate documentation of the arrhythmia would have been beneficial and may have lead to starting prophylactic treatment in the antenatal period.

The treatment of SVT is complicated by pregnancy, with the changes in physiology and fetal concerns, and is based on a number of factors. These include the haemodynamic status of the woman, gestation and symptoms. Most SVT's are benign and will respond to vagal stimulation or valsalva manoeuvre.[2] However, a minority of SVT's will require further treatment. The obstetrician plays an important role in understanding the impact of any treatment on the fetus. For this reason, knowledge of adverse fetal outcomes associated with different treatments is vital, although maternal condition takes priority at all times.

The three most commonly used antiarrhythmic medications used in an acute SVT are adenosine, calcium channel blockers (most commonly verapamil) and beta-blockers. There is good evidence that adenosine and verapamil are safe in pregnancy.[1,2,4,6,7] Adenosine causes a transient heart block, causing a period of maternal asystole, and has been shown to successfully terminate some SVTs in pregnancy.[8] However, due to its transient effect, the SVT may return after its effect wears off, as in our case. Beta-blockers are used with caution in pregnancy due to the risk of intrauterine growth restriction.[9] However, evidence seems to show this is not the case if used outside the first trimester.[2] Metoprolol is therefore considered safe, but due to its metabolism, larger doses are often needed to maintain beta blockade in pregnancy.[10]

Electrical cardioversion is considered safe in pregnancy. The main fetal concern is reports of fetal bradycardias during or after the procedure, requiring an emergency Caesarean section.[2] However these are rare, and as electrical cardioversion is reserved for more severe cases where medical treatment has failed and there is maternal compromise,[1,2,4,11] this is an acceptable risk. This is especially true as in SVT, the electrical shock delivered to the myocardium should be synchronised with the peak of the QRS complex. This means a lower voltage is required to achieve cardioversion as compared with unsynchronised shocks.

There is minimal literature regarding the treatment of SVT in labour, so doctors rely on personal experience. Women's bodies are under extreme stress, and some authors have suggested performing a Caesarean section to avoid this stress and allow easier treatment of the arrhythmia.[4]

In our case we managed to treat the arrhythmia in labour chemically, and allow the woman to progress to a vaginal delivery. This was because the patient remained haemodynamically stable throughout, and the fetal heart beat remained normal. Many obstetricians will not have seen an acute case of SVT presenting in labour. Most cases are identified in the antenatal period, where the urgency to treat the patient is not present. While patients remain stable, consideration can be made to managing patients medically while the labour progresses, and a vaginal delivery may be possible. However, as with all cases, the overall situation needs to be looked at, and if there are any concerns about maternal or fetal condition this may not be possible.

While the tachyarrhythmia itself does not seem to cause morbidity to the women, resorting to a Caesarean section may put patients at risks. Obstetricians should not feel pressurised into performing one when not clinically indicated for obstetric reasons when the patient is stable.

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Contributorship

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